and was easily remedied by lifting the head by the scalp edges, thus allowing the brain to drop back into place. A scalp tourniquet should not be used, for its pressure would increase cerebral herniation through the dural opening.

References

1. Warwick, M.—Cerebral hemorrhage of the newborn, Am. J. M. Sc. 158:95 (July) 1919.
2. Rodda, F. C.—The coagulation time of blood in the new-born, with especial reference to cerebral hemorrhage, J. A. M. A. 75:452 (Aug. 14) 1920.
3. Green, R. M.—Intracranial hemorrhage in the newborn, Boston M. & S. J. 170:682 (April 30) 1914.
4. Rodda, F. C.—Studies with a new method for determining the coagulation time of the blood in the new-born, Am. J. Dis. Child. 19:269 (April) 1920.
5. Seitz, L.—Ueber Hirndrucksymptome bei Neugeborenen in Folge intracranieller Blutungen und mechanische Hirninsulte, Arch f. Gynäk. 82:528, 1907.
6. Cushing, H.—Concerning surgical intervention for the intracranial hemorrhages of the newborn, Am. J. M. Sc. 130:563 (Oct.) 1905.
7. Henschen, K.—Diagnostik und Operation der traumatischen Subduralblutung, Arch. f. klin. Chir. 99:67, 1912.
8. Gilles, R.—Deux observations d'hémorragie méningée chez le nouveau-né; guerison après ponction decompressive par voie lombaire dans un cas, par voie crânienne dans l'autre; état ultérior des petits malades et considérations thérapeutiques, Rev. mens. de gynéc., d'obstét. et de pédiat. 7:465 (July) 1912.
9. Green, R. M.—Further experience in the treatment of intracranial hemorrhage in the newborn, Boston M. & S. J., 174:947 (June 29) 1916.
10. Murphy, F. T. & Torbert, J. R.—Case of cerebral hemorrhage in the newborn. Delivered by operation, Boston M. & S. J, 162:642 (May 12) 1910.
11. Potocki & Levant—Hémorrhagies ventriculaires à apparition tardive chez le nouveau-né, Ann. de gynéc. et d'obstét., 2 ser., 13:714, 1919; quoted by Ballantyne, J. W.—Cerebral ventricular hemorrhages at and soon after birth, Edinburgh M. J., N. S. 25:63 (July) 1920.
12. Devraigne, L.—Valeur diagnostique, prognostique et thérapeutique de la ponction lombaire chez le nouveau-né, Presse med. 13:513 (Aug. 16) 1905.
13. Dutreix, M.—La ponction lombaire dans le diagnostic et le traitement de l'hémorrhagie méningée chez le nouveau-né, Thèse de Paris, 1905.
14. Brady, J. M.—Lumbar puncture in meningeal hemorrhage of the newborn, J. A. M. A., 71:347 (Aug. 3) 1918.
15. Foote, J. A.—The hemorrhagic tendency as a frequent cause of cranial hemorrhage of the new-born, Am. J. Dis. Child., 20:18 (July) 1920.
16. Lippman, M. J.—Meningeal hemorrhage in the newborn. Complete recovery; report of a case, New York M. J., 103:263 (Feb. 5) 1916.
17. Vaglio, R.—Trattamento delle emorragie intracraniche del neonato, La Pediatria, 29:12 (Jan. 1) 1921.
18. Simmons, C. C.—Two cases of intracranial hemorrhage in the newborn relieved by operation, Boston M. & S. J., 166:43 (Jan. 11) 1912.
19. Cumston, C. G.—Meningeal hemorrhage in the newly-born infant, Internat. Clin. 24 S., 2:226, 1914.
20. Chipault, A.—Maladies du crâne et de l'encéphale, in Le Dentu & Delbet: Traité de chirurgie, 4:661, 1897.
21. Cushing, H.—Injuries of the head in the newborn, in Keen's Surgery, 3:90, 1908.
22. Seitz, L.—Ueber Lokalisation und klinische Symptome intrakranieller Blutergüsse Neugeborener. Muench. med. wchnschr., 55:608 (March 24) 1908.
23. Meara, F. S. & Taylor, A. S.—A case of cerebral hemorrhage (birth) with operation, Arch. Pediat., 26:846 (Nov.) 1909.
24. Hubbard, J. C.—Discussion of Torbert's paper, Boston M. & S. J., 160:516 (April, 22) 1909.
25. Bailey, H.—Cranial and intracranial birth injuries, Am. J. Obst. & Gyn. 1:52 (Oct.) 1920.
26. Strachauer, A. C.—The surgical treatment of cerebral hemorrhage in the newborn, Minn. Med., 3:577 (Dec.) 1920.

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OVARIAN AUTOTRANSPLANTATION *

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My experience in ovarian transplantation has been limited entirely to autotransplants and the results in ten cases will be given. The two circumstances under which these operations were performed were:

First: Three cases of hysterectomy with double salpingo-oöphorectomy and transplantation of parts of one or both ovaries into the abdominal wall. In all cases the grafts took and in all cases there has been periodic enlargement and varying degrees of tenderness in the grafts. All cases have had ablation symptoms since operation, but these symptoms have been markedly lessened during the period that the grafts showed activity. These findings are contrary to those of Tuffier, who states that while the grafts increase in size monthly for two or three years after hysterectomy, it is without any benefit to the patient.

Second: Six cases of double salpingo-oöphorectomy without hysterectomy and with autografts from either one or both ovaries into the abdominal wall, and one case of double salpingo-oöphorectomy without hysterectomy with autotransplants into wall of uterus. The justification for leaving the uterus and transplanting the ovaries is: the suppression of pain which follows retained ovaries with damaged blood supply and extensive denudation of the surface of the ovary, permitting adhesions and cystic degeneration and, most important of all, the preservation of menstruation, because that function is absolutely necessary along with ovulation to ensure the patient freedom from the distressing trophic, congestive and nervous symptoms which follow suppression of menstruation.

Surgical Technique: The technique of autografting is simple indeed and adds no extra risk to the operation. In all cases the ovaries were completely removed and the uterine end of the tube resected by a V-shaped incision into the cornua of the uterus. The ovaries were then wrapped in gauze and placed in a vessel containing normal salt solution at about 100° F. The operation and peritoneal toilet were then completed and in some cases a pocket was made, by blunt dissection, between the peritoneum and the under surface of the rectus muscle, on either one or both sides of the incision, according to the number of grafts to be used. The ovaries were then carefully inspected and areas of cystic degeneration were culled out. The remaining ovary, when possible, was cut into disks 2x2x½ cm. and from one to three of these disks were transplanted into the already prepared pockets. No sutures were used to hold the grafts in place. On removing the grafts from the saline solution, one is at first apt to be rather startled at the pale, lusterless and shriveled appearance of the grafts, but this apparently does not interfere in any way with the success of the grafts. The abdominal wall was closed in the usual manner.

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In other cases the grafts were inserted into a bed prepared on top of the anterior sheath of the rectus muscle, and in the subcutaneous fat, three or four cm. to either side of the incision.

I have never used grafts of the whole ovary and believe that better results will be obtained from multiple or seedling grafts, because a much larger surface is obtained which insures a better blood supply.

In one case the grafts were embedded into the cornua of the uterus after removal of the tubes. No matter where the grafts are embedded, the results seem equally good, provided the graft is asceptic, the field has an adequate blood supply, and the site chosen permits the graft to enlarge periodically without compression and consequent pain. I believe that the suggestion of Whitehouse, that the ovarian tissue be left in contact with the body fluids within the peritoneal cavity until required for grafting, to be a good one and in future I will place the grafts in the pouch of Douglas while completing the pelvic work and removing them just prior to closing the abdomen.

Average age was 30½ years, youngest 20 years and the oldest 41 years.

Summary of Cases: Immediate results of operation were uniformily good. Patients who had been grafted show no symptoms or complications different from other patients subject to pelvic operation.

Ultimate Results: As the time elapsed since the first operation is only 18 months, results for the first year and a half only can be given.

First—Cases with hysterectomy. All showed ablation symptoms varying from slight to moderately severe. All cases showed activity of grafts as indicated by periodic enlargement and tenderness of the grafts and amelioration of the ablation symptoms at this time. In none of the cases in which hysterectomy was done have the patients been entirely free from the symptoms of artificial menopause. Ablation symptoms appeared at the following times after operation: Three weeks, six weeks and four weeks, respectively.

The symptoms of menopause can be classified as slight in two cases and moderately severe in one case. In none of the cases are the symptoms constant and all show a tempering of these symptoms by the presence of the ovarian grafts.

Second—Cases without hysterectomy. 1. Time after operation of appearance of menstruation:

Case 1. Menstruation 4½ months, scanty at first, now moderate and regular, no pain.

Case 3. Menstruation 6 months, regular, 1½-day flow.

Case 4. Menstruation at 9 weeks after operation, scanty at first, now regular, 7 days, no dysmenorrhoea.

Case 5. Unable to trace patient.

Case 7. Menstruation at 5 weeks after operation, scanty at first, now heavy and regular, no dysmenorrhoea. On March 7, 1921, patient had her regular normal five-day flow. On March 23, 1921, she began to flow moderately again, but without pain. This continued for 10 days, when she was sent to San Francisco Hospital and curetted by Dr. Gibbons. Pelvic examination negative except for slightly enlarged uterus. Microscopic examination of curettings showed normal menstruating endometrium. Wassermann taken at time of first operation was doubtful, but is XXX at present, which probably accounts for the metrorrhagia.

Case 8. Menstruation at 3 months after operation, scanty, one day, no pain.

Case 10. Menstruation at 5 months. Scanty at first, now moderate flow, no pain.

2. Effect on ablation symptoms: Case 1. Severe until menstruation. Now only occasionally and very slight. Case 4. Slight flushing and nervousness until menstruation. Now only occasionally and slight. Thinks she is not more nervous than before operation. Case 7. No symptoms of artificial menopause. Case 8. Moderate flushing and nervousness until menstruation. Now only very slight symptoms, which are getting milder all the time. Case 10. Moderate symptoms for four months after operation. Now free for as long as two months at a time. Symptoms only occasional and slight.

CONCLUSIONS

1. Autografting of ovaries is a perfectly safe and rational procedure and is indicated, except in cases of malignancy or ovaries grossly infected in all patients requiring removal of the ovaries, with or without hysterectomy.

2. Ovaries requiring removal are: (a) Badly traumatized ovaries with much raw surface on capsule; (b) ovaries showing considerable cystic degeneration; (c) ovaries having a impaired blood supply.

3. Cystic degeneration of ovaries is no barrier to autotransplantation and ovaries removed in conditions of pyosalpinx can be transplanted, provided the ovaries themselves are not grossly infected.

4 Autotransplantations certainly lessens and delays ablation symptoms followig castration and in some cases affords complete freedom from symptoms of artificial menopause. Autotransplantation lets patient down easy.

5. That the autografts functionate is shown by periodic increase in size and tenderness of grafts with amelioration of ablation symptoms, and when the uterus remains, by menstruation.

6. When the ovaries are found suitable for transplantation, when possible the uterus should be allowed to remain, myomectomy done in fibroids, and as the body of the uterus adjacent to the tubes and the cervix are the two areas of persistent infection in inflammatory disease, the fundus should be resected and the cervix treated by deep cauterization or a Sturmdorf tracheloplasty, or amputated when this condition is present.

7. It is an established fact that a small portion of an ovary successfully engrafted anywhere furnishes to the subject of the graft the secretion or influence which preserves her sexuality, and prevents atrophy of the genital organs and other changes in the individual that are coincident with complete castration.

8. After ovarian transplantation certain cases show marked increase in sexual stimulation.

9. Reasonably healthy and undamaged ovaries should be left in situ with or without the uterus and autotransplantations should be used to carry on the physiological functions of the ovary only in those cases where, for reasons given above, both ovaries must be removed.

In studying the literature in regard to ovarian transplantations, one is impressed with the amount of experimental work which has been done along these lines, both in this country and in Europe. Although the findings of many of these investigators have been widely divergent, they all agree that the autotransplant is the method most promising of success, and that homografts and heterografts are successful in a much less degree. Also, the results after ovarian transplantation are de-

cidedly more brilliant in animal experimentation than when done in the human subject. Franklin Martin of Chicago in 1915 gave an excellent summary of the work done by various investigators in ovarian transplantation.

To quote the conclusions of various experimentors—Benthin thinks that the effects of ovarian transplantation are good, but that the experimental results are more successful than the therapeutic. Transplantations of small bits of ovary, while it gives good results, does not guarantee their permanency. Homotransplantation should be undertaken only in very young individuals, and in homotransplantations it is very important that the organs should be transplanted immediately after removal from the donor.

Stocker reports two cases in which he did an autotransplantation of part of an ovary. In one patient, age 28, a pan hysterectomy was done for a gonorrheal condition with extensive adhesions. One of the ovaries was cut out of the excised mass and sliced into disks only two or three mm. thick. An implanted disk of this kind grows into place very rapidly, as blood vessels soon grow through it. The bed into which it is implanted must be rich in blood vessels and must protect the graft from injury from without. Stocker implanted the graft in a fold of peritoneum and wound healed by primary union. An epinephrin test was made on the fifth day and there was no specific response as there is when the inhibiting influnce of the ovaries is entirely withdrawn. The patient never had any symptoms of artificial menopause and was restored to health after five years of semi-invalidism. Three years later an intestinal tumor necessitated a laparotomy. The disk of ovarian tissue was found to be about the size as when implanted and very vascular. In his second case the tube and ovary had been removed on one side for ruptured tubal pregnancy and two years later on the other side for the same condition. At the second operation a disk of ovary was transplanted into a fold in the peritoneum and menstruation continued regularly and patient's condition was excellent.

Norton agrees with Tuffier that cystic degeneration of the ovary is no bar to transplantation and he has grafted ovaries that were almost entirely cystic, cutting out the medium sized and larger cysts and implanting the residue. Some of these ovaries seemed hopelessly diseased and had been causing much pain over a long period of time. In these cases the patients were free from pain and menstruated regularly. He considers the operation one of the most satisfactory advances in modern surgery and recommends it in diseases of the ovaries. It should always be done instead of double oöphorectomy in idiots, defectives and criminals. Except for the fact that it does not allow pregnancy, it fulfills all the requirements of an ideal operation. It can be easily and quickly done. The functions of the ovary, both as to internal secretion and menstruation, are maintained and at the same time the ovary is placed in a clean, healthy bed completely protected from subsequent attacks of gonorrhoeal infection. With a new and diminished blood supply sclerosis and cystic degeneration are prevented or retarded. A small portion of the ovary retained within the abdomen seems to retain the power of the organ as a whole.

Lydston gives a summary of his previous work on sex gland implantation. He believes that the sex gland harmone is the most powerful cell stimulant, nutrient, and regenerator known to medical science and that sex gland transplantation preserves harmone production for a long time. He believes that certain physiologic and therapeutic advantages are permanent. In his cases the implanted tissue has never disappeared in less than twelve to eighteen months. Microscopic sections of the implanted gland show regeneration of circulation and the interstitial connective tissue which probably produces the so-called internal secretion.

Blair Bell found that if ovaries be excised and transplanted into the muscle of the uterus or abdominal wall, atrophy of the genital ducts will not occur. He found that the follicles first become cystic and then degenerate; that is to say, they ripen; but if completely buried cannot expell the contents and therefore become cystic and retrogress. He also noted that in the rabbit, if only the central portion of the ovary, which contains no follicles, be implanted, the interstitial cells of which the graft is composed, can maintain the integrity of the uterus alone. It is possible that ovarian transplantation in general and of the interstitial cells in particular, are capable of keeping normal the uterus, mammæ and other endocrine organs and the general metabolism, in the female. He concludes that it is not the ovaries alone which influence the female characteristics and genital functions, except in regard to the production of ova. The ovaries are only a part of the system to which most, if not all, of the other endocritic organs belong and in which these other organs figure with as great importance as the ovaries themselves.

In twenty-three cases of hysterectomy with autotransplantation of ovaries into the abdominal wall, done by Graves, he found that the ablation symptoms were almost identical with those in completely constrated women. He has had better results in treating ablation symptoms with ovarian extract and his results were better with extract of the whole ovary than when corpus luteum was used alone. He thinks that there is certainly an ovarian secretaion that is not produced in the corpus luteum, for profound effects are produced by removal of the ovaries before puberty when there are no corpus lutea. He does not know whether this early secretion originates in the follicles or the highly differentiated connective tissue of the ovarian stroma. The cause of vaso-motor disturbances following removal of the ovaries, Graves thinks to be due to the influence of some other organ of internal secretion, which has been rendered abnormally active by the loss of the balancing power exerted by the ovarian secretion. It is conceivable that the thyroid is made overactive by the removal of the ovaries and that the ablation symptoms are manifestations of hyperthyroidism.

Tuffier affirms that symptoms of artificial meno-

pause are due almost exclusively to the suppression of the menstrual function. Modern research has demonstrated the close connection and reciprocal action of the various glands with an internal secretion and their reciprocal changes when one functionally drops out. Therefore, special efforts should be made to preserve the balance between the various ductless glands. He transplants the ovaries into the subperitoneal tissue no matter how sclerocystic the ovaries are, provided they are aseptic.

He found that from three to five months later the grafts showed phenomena of congestion and about one week later menstruation began. In the interval between menstruation the grafts were scarcely palpable. In a report of 19 of 44 cases all but one menstruated in from three to seven months. During the period of latency all had symptoms of menopause which cleared up with restoration of menstruation. In autografts when the uterus was removed there was monthly ovulation, but the symptoms of menopause persisted. He conserves the uterus wherever possible when autografting ovaries, or does a partial hysterectomy, leaving enough of the body of the uterus to carry on the menstrual function. He regards these conservative measures especially indicated in cases of excessive thyroid function or when the symptoms of menopause are liable to be unusually severe and protracted with hyperthyroidism. Tuffier, in a paper presented at the London meeting of the Clinical Congress of Surgeons of North America in 1915, again insists that the beneficial effects of ovarian transplantation are due to the resulting menstruation and that ovulation without menstruation (as when uterus is removed) is without value.

He states: "My purpose in addressing you on this subject is to lay before you my experience in grafting of ovaries in the hope that menstruation might be preserved after operations for salpingitis and fibroids of the uterus."

CASE REPORTS

(1) Mrs. G. Age 33. **Operation:** September 3, 1919. Dilatation and curetage, deep cauterization of cervix, bilateral salpingo-oöphorectomy. Autografts left ovary into pockets between peritoneum and under surface rectus muscle on either side of incision. **Pathology:** Intraligamentous cyst right ovary size of small orange. Left ovary size of walnut and cystic. Both tubes closed, adherent and hydrosalpinx present.

Examination: September 29, 1920. Grafts not palpable. Patient has noticed slight tenderness of wound before menstrual periods. Patient had quite severe ablation symptoms until menstruation appeared January 12, 1920, when she had a profuse flow for one day. Since that time she has had only occasional flushing and at times she is free for as long as one month. Flows regularly every month from two to three days and has no dysmenorrhoea. In May flowed only one day and about that time flushing and nervousness were more severe than at any time since operation. That was the only time since menstruation began that ablation symptoms have been at all severe or that menstruation was diminished.

Vaginal Examination: Uterus normal size and position, freely movable, no tenderness, no pelvic masses. Patient states that since her operation sexual desire has been considerably increased and has remained so for more than one year.

(2) Mrs. C. B. Age 27. **Operation:** October 19, 1919. Hysterectomy, supravaginal, bilateral salpingo-oöphorectomy, separation of extensive intestinal and omental adhesions. Autotransplantation of ovarian grafts. **Pathology:** Both tubes buried in adhesions from previous pelvic peritonitis. Right tube closed, thickened, convoluted and adherent to right ovary and posterior surface of broad ligament. Left tube adherent to sigmoid and posterior surface of uterus, omental adhesions to uterus and adnexa. Ovaries enlarged, cystic and chronically inflammed.

Bilateral transplantation of ovarian grafts in pocket made between posterior surface of rectus muscle and peritoneum. Wound healed, primary union.

April 2, 1920. Ovarian grafts definitely palpable. Patient has thin abdominal wall. Patient states grafts vary in size, at times become enlarged and tender, remaining so for several months. During this time she feels much more energetic and has only slight flushing and some nervousness. Two months previously grafts were hardly palpable and patient had quite severe flushing, was extremely nervous and easily tired.

September 28, 1920. Grafts about same size as when examined last. Patient states that grafts enlarge and become tender at irregular intervals, during which time she feels better and is much less nervous. She now looks forward to those intervals of remission from flushing and nervousness and can tell when they are coming by the condition of the grafts.

(3) Miss C. J. Age 35. **Operation:** December 17, 1919. Partial hysterectomy, leaving lower third body of uterus. Bilateral salpingo-oöphorectomy, ovarian transplants from left ovary in abdominal wall. **Pathology:** Multiple submucous and intramural fibroids of upper half of uterus. Small dermoid cyst right ovary. Cystic degeneration of left ovary. Three sections from left ovary transplanted into abdominal subcutaneous tissue. Two pieces on right, one of left side.

Examination: April 20, 1920. Grafts feel larger than at any time since operation, slightly tender. For last two months patient has had flushes and dizzy spells. Have been less since grafts have enlarged. Feels as though she were going to menstruate.

June 20, 1920. Menstruated for one day. Moderate flow, very few flushes for past two months. Feels fine. Much less nervous. Grafts enlarged in May and again one week before flow commenced.

July, 1920. No menstruation but felt as though she would. Feels fine.

September 18, 1920. Flowed 1½ days. No pain. No flushes or nervous symptoms.

(4) Mrs. N. B. Age 38. **Operation:** January 15, 1920. Excision cyst left Bartholin's gland. Double salpingo-oöphorectomy. Resection fundus uterus. Freeing of adhesions, appendectomy, autotransplant of ovary into abdominal wall. **Pathology:** Bilateral tubo-ovarian masses and fundus adherent to omentum and sigmoid. Ovaries enlarged, cystic degeneration marked. Tubes distended, fimbriated ends sealed, hydrosalpinx. Left tube and ovary densely adherent in cul-de-sac. Much raw surface on fundus due to adhesions. Resection below attachment of round ligament. Reimplantation of round ligament.

Autotransplant size end of index finger from right ovary. Transplant into pocket between peritoneum and under surface left rectus muscle.

January 28, 1920. Wound healed primary union. Examination October 12, 1920: First menstruation nine weeks after operation. Scanty flow, no pain. Three days' duration. About two weeks before menstruation began she had moderate hot flushes and some dizziness which disappeared at onset of period. Has had regular monthly periods since operation with the exception of the August period, which was missed entirely. During this

time the ablation symptoms were somewhat more severe than at any time since operation.

As a rule she menstruates seven days, scanty first two days, moderate the other five days. No pain. Abdominal wall slightly sensitive during menstruation. At present has only occasional flushing and very slight. Thinks that she is not more nervous than before operation.

Vaginal Examination: Shows small uterus, somewhat adherent, not painful. No masses or tenderness in right and left pelvic regions. Graft in abdominal wall not palpable. Patient also stated that while in hospital she was troubled with nightly amorous dreams and she is now more passionate than she has been for years.

(5) Mrs. D. C. Age 20. Admitted S. F. H. August 7, 1919. Diagnosis: Bilateral salpingitis, chronic. Cervicitis, chronic. Discharged improved. Re-admitted October 8, 1919. Diagnosis: Bilateral salpingitis, chronic. Urethitis, acute. Erosion of cevix. Re-admitted December 5, 1919. Diagnosis: Salpingo-oöphoritis bilateral, subacute. Endocervicitis. Erosion of cervix. **Operation:** January 20, 1920. Curetage, cauterization of cervix, double salpingo-oöphorectomy, appendectomy, ovarian transplant into left cornua of uterus. Transplant from left ovary, 2x1x½ cm. **Pathology:** Both tubes and ovaries surrounded by light adhesions and bound down to posterior surface of broad ligament and sigmoid. Both tubes thickened, friable and fimbriated ends sealed. Ovaries enlarged, moderately cystic, size of large walnuts and after being freed showed large areas of raw surface, and it was considered advisable to remove them to prevent adhesions and further cystic degeneration. Uterus normal size and position, body firm, very few raw areas, which were closed. Decided to leave uterus and section of left ovary 2 cm. by 1 cm. transplanted in left cornua of uterus.

Unable to trace patient, so cannot give results.

(6) Mrs. G. L. Age 20. **Operation:** March 20, 1920. Deep cauterization of cervix. Double salpingo-oöphorectomy. Supra-vaginal hysterectomy. Freeing of adhesions, autotransplants. **Pathology:** Dense adhesions of omentum and sigmoid to double tubo-ovarian masses and fundus and posterior surface of uterus. Both tubes and ovaries adherent to posterior surface of uterus. Double pyosalpinx. Ovaries size of large walnuts, cystic and seat of inflammatory disease. Uterus larger and softer than normal. Uterus too badly involved by adhesions and metritis to leave. One section 2x1 cm. taken from each ovary and transplanted into subcutaneous fat on either side of incision.

April 1, 1920. Wound healed, primary union.

June 15. Severe flushes since three weeks after operation. Says she is more nervous. Grafts palpable but smaller than at operation.

August 10, 1920. Grafts larger than previously, moderately tender, began enlarging about one week ago. No flushes or nervousness for past ten days. Feels fine.

October 2, 1920. Grafts seem to enlarge and become tender about once a month. During this time the patient feels much better than during the intervals when grafts are small. Has much less flushing and nervousness but is never entirely quite free from these symptoms.

(7) Mrs. E. S. Age 30. **Operation:** June 17, 1920. Curetage, anterior colporrhaphy, perineorrhaphy, double salpingo-oöphorectomy, appendectomy, freeing of adhesions. Autotransplantations both ovaries into abdominal wall. **Pathology:** Both ovaries and tubes adherent in cul-de-sac by firm adhesions. Lumen of tubes closed. Both ovaries equally cystic. Corpus luteum cysts. Appendix adherent to right tubo-ovarian mass. Uterus normal size and position, not adherent. Apparently healthy and not removed. Autotransplants from both ovaries 2x2x1 cm. One transplant on either side of abdominal wound in subcutaneous tissue.

June 20, 1920. Slight separation at upper end and middle section of wound. No serum or purulent discharge. Closed with adhesive plaster.

July 6, 1920. Wound closed. Grafts palpable. No tenderness.

October 1, 1920. No flushing, palpitation or nervous phenomena since operation. First menstruation July 26, scanty, lasted for four days, used one pad a day. Grafts not tender. Second menstruation, August 18, menstruated for five days, good flow. Stopped for one day, then menstruated slightly for two days, soreness in either side of wound.

September 19, 1920. Flowed five days, heavy flow, no discomfort. Noticed a peculiar feeling in region of grafts for three days after menstruation had stopped. Patient states that periods are now more regular and that she had less discomfort than at any time since she can remember. Previously periods were very irregular, amenorrhea varying from three to nine months. Patient volunteered that she had feared loss of sexual desire after the operation, but such has not been the case. Is now the same weight as when in the best of health.

Pelvic Examination: Uterus normal size and position, not tender, movable. Pelvis free, no tenderness. Grafts palpable, not tender.

(8) Mrs. J. T. Age 41. **Operation:** July 22, 1920. Dilatation, curetage, double salpingo-oöphorectomy, appendectomy. **Pathology:** Both tubes enlarged, ends sealed, tubes distended with clear fluid. Left ovary size plum, marked cystic degeneration, densely adherent to posterior surface left broad ligament and pelvic wall. Right ovary adherent, normal size, cystic degeneration moderate. Uterus normal size and position, very few adhesions to uterus, hence not removed. Appendix retrocecal, adherent, removed.

Right ovary placed in normal saline solution, temperature 100°. Three sections of right ovary 2x½ cm. placed in pockets made in subcutaneous tissue 3 cm. to right and left of incision. Two transplants made on left side, one on right side.

August 2, 1920. Wound healed, primary union. Grafts palpable, not tender.

August 28, 1920. Grafts larger than previously, slightly tender. Has had few slight flushes, slightly more nervous. Is regular time for menstruation. Thinks that there is slight thin white discharge from vagina.

September 6, 1920. Grafts smaller than last week, not tender. Less nervous, no flushes. Feels fine, gained seven pounds in weight.

October 7, 1920. Grafts somewhat enlarged and sensitive about the end of the month. Patient notices a periodicity in the change in the grafts. States that they enlarged once a month and about the time that she used to menstruate before the operation. Four days after grafts enlarged this last time she had a slight flow for one day only. No pain or pelvic discomfort. One month previous to this time she felt as though she was going to menstruate but had only a thin, white vaginal discharge. States that the "hot spells," nervousness and slight dizziness that she noticed after the operation are much less.

(9) Mrs. C. B. L. Age 34. **Operation:** August 3, 1920. Dilatation and curetage. Supravaginal hysterectomy, bilateral salpingo-oöphorectomy, appendectomy. **Pathology:** Uterus retroverted and bound down to rectum by dense adhesions to tubes and ovaries bound down by adhesions to cul-de-sac. Uterus larger and softer than normal. Bilateral pyosalpinx and cystic degeneration of ovaries. Ovaries badly lacerated during removal. Autotransplants of piece of each ovary 2x2x1 cm. into subcutaneous fat.

Convalescence normal. Wound healed, primary union.

October 9, 1920. Grafts palpable, not tender. Three weeks after operation had flushes of heat, not severe. Patient somewhat more nervous since operation. Has noticed no change in size of grafts. Flushes remain about same and do not inconvenience patient. Has been working hard and thinks some of nervousness due to that.

(10) Mrs. C. B. Age 27. **Operation:** August 18, 1920. Curetage, cauterization of cervix double salpingo-oöphorectomy. Denudation of sigmoid repaired by omental grafts. Appendectomy. Subcutaneous ovarian transplants, two in left and one in right side of incision. **Pathology:** Sigmoid adherent to left tubo-ovarian mass size of an apple, peritoneal coat of sigmoid torn in several places during separation. Left tubo-ovarian abscess. Right pyosalpinx, right ovary adherent to tube and pelvic wall and appendix. Ovary badly traumatized and surface denuded. Fundus of uterus resected down to attachment of round ligaments. Right ovary removed because of damage to blood supply and extensive denudation of surface. Such an ovary would have become painful, adherent and cystic. Three grafts 2x2x1 cm. transplanted into subcutaneous tissue.

October 12, 1920. Moderate ablation symptoms began five weeks after operation. No menstruation to date. Grafts palpable, no change in size, not tender.

March 26, 1921. Wound became sensitive in region of grafts about end of December. Again became sensitive in second week of January and five days later had slight flow for one day. Since January flows regularly for three days, moderate amount and has no pain. Moderate flushing was present for four months after operation. Now free for as long as two months at a time and is only occasional and slight.

Pelvic Examination: Uterus normal size, slightly pulled to left, not tender. Pelvis is negative, no palpable enlargement of grafts, but slight tenderness of wound.

OVARIAN AUTOTRANSPLANTATION WITHOUT HYSTERECTOMY

No.	First Menstruation Post Operation	Ablation Symptoms	Condition of Grafts
1.	4½ months after operation. Now regular. No pain.	Severe up to menstruation. Now decreased and mild.	Grafts not palpable, but slight tenderness of wound before and during menstruation. Uterus normal size and position, freely movable, no tenderness or pelvic masses. Increased sexual desire.
3.	6 months after operation. Now regular, no pain. 1½ days.	Moderate flushes for first 7 months. Now entirely free.	Grafts palpable. Slightly tender. Enlarge one week before menstruation.
4.	9 weeks. Scanty at first. Now regular. 7 days. No pain.	Moderate flushes and nervousness for 3 months. Now only occasional and slight.	Uterus small, somewhat adherent. No pelvic masses or tenderness. Sexually stronger than for years.
5.	Unable to trace patient.		
7.	5 weeks, scanty at first. Now regular, 5 days' heavy flow, no pain.	No ablation symptoms since operation.	Grafts not palpable. Has peculiar feeling in region of grafts during menstruation. Uterus normal size and position, movable, no masses or tenderness.
8.	3 months scanty, 1 day. No pain.	Moderate symptoms after operation. Less now.	Monthly enlargement and tenderness of grafts.
10.	5 months, scanty at first. Now 3 days, moderate flow. No Pain.	Moderate symptoms for 4 months after operation. Now free for as long as 2 months at a time. Symptoms only occasional and slight.	Uterus normal size, slightly pulled to left. Not tender, pelvis negative. No palpable enlargement, but slight tenderness of wound.

OVARIAN AUTOTRANSPLANTATION WITH HYSTERECTOMY

No.	Ablation Symptoms	Enlargement and Tenderness of Grafts
2.	Began 6 weeks after operation. When grafts are small she has severe flushing and nervousness. When grafts are enlarged she has slight symptoms and is much more energetic and feels fine.	Grafts palpable. Enlarge at irregular intervals. Grafts slightly tender.
6.	Moderate flushing and nervousness began 3 weeks after operation. Ablation symptoms very much tempered by enlargement of grafts, but never entirely free.	Enlargement and tenderness of grafts monthly.
9.	Flushing began between 3 and 4 weeks after operation. Now only slight and do not inconvenience patient.	Grafts palpable, but do not change in size.

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